Managing Data for Clinical Care Delivery and Research

Getting More Bang For Your Buck

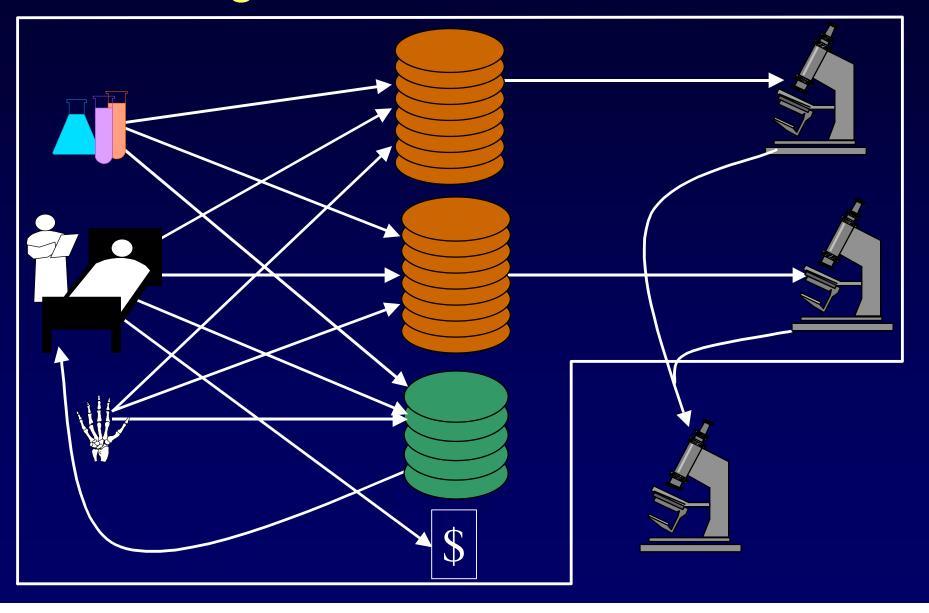
Standards & Terminologies

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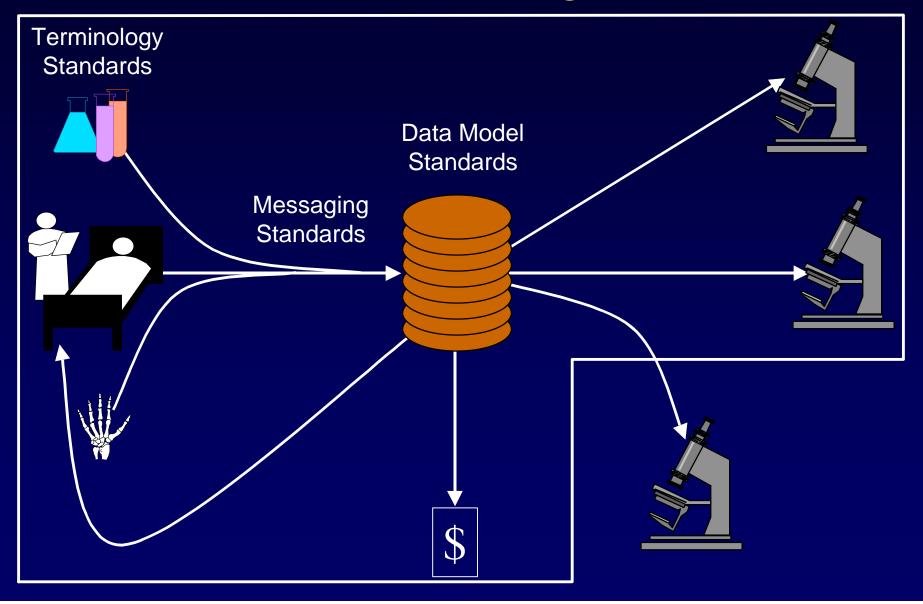
Use and Re-Use of Clinical Data

- Primary use: report back to clinicians
- Secondary uses:
 - Patient care
 - Administrative
 - -Research!

Collecting Clinical Data for Research



Standards for Collecting Clinical Data



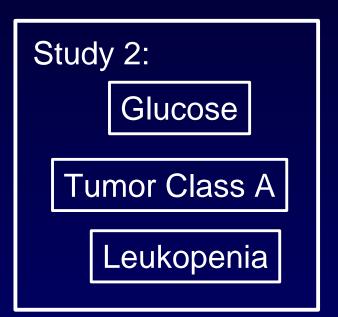
Nonstandard Terminologies

Study 1:

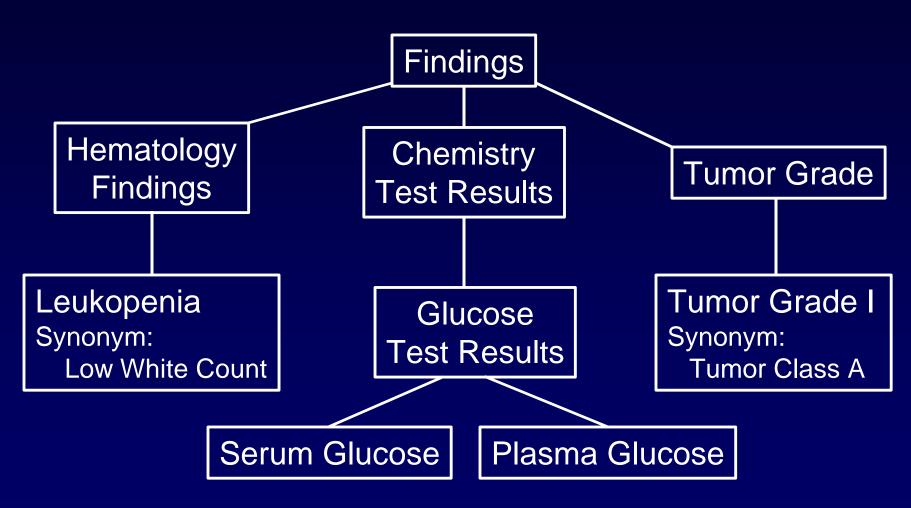
Low White Count

Tumor Grade I

Serum Glucose



Standard Terminology



Terminology Standards

- Coding vs. abstraction
- Intended use vs. ability to re-use
- Granularity of care vs. research concepts
- Classifications
- Pre-coordinated vs. postcoordinated (e.g., "Right Kidney" vs. "Right" + "Kidney")

High-Quality Terminology

- Concept-oriented
- Breadth and depth
- Multi-grained
- Multiple classifications
- Maintenance process

Case Studies

Data summarization

Data Summarization

- Data collected for patient care
- Summaries over time
- Multiple labs/institutions
- Multiple user interfaces

Outpatient Summary

Chen-20	C7 +	Misc.Che+	Misc.Chen	C7 +	C7	C7	C20 +	C7	C7	C7
	22:50 24 Mar 99	10:00 25 Jan 99	23:30 24 Jan 99	17:15 24 Jan 99	13:35 14 Oct 97	9:15 12 Apr 97	18:20 10 Apr 97	10:20 07 Apr 97	10:10 06 Apr 97	10:00 05 Apr 97
Na	138	138		140	142	141		139	137	141
K	4.0	4.0		4.4	4.6	3.7		4.0	3.8	3.7
C1	107	105		107	108	114		108	107	107
BUN	16	11		11	14	17		18	13	11
Creat	1,7	1,2		1,3	1.3	1,1		1.0	1.0	1.0
Gluc	133	87		94	85	76		82	88	87
Ca	8.0						8.0			
Phos	2.8									
Chol				105 *						
Alb				3.6						
TBili				0.9						
DBili				0.2		, Ja				
Tot Alk P				70						
AST				47						
ALT		. 4		22		- /4				
CK		165	155	152						

Inpatient Summary

	Chem-20																	
	Na	K	Cl	HCO3	BUN	Creat	Gluc	Ca	Phos	Urate	Chol	Tot Prot	Alb	TBili	DBili	Tot Alk P	AST	ALT
24M ar99 22:50	138	4.0	107	27	16	1.7	133	8.0	2.8									
25Jan99 10:00	138	4.0	105	27	11	1.2	87											Ű
24Jan99 23:30				.0					6 5		57			5. 5.				
24Jan99 17:15	140	4.4	107	30	11	1.3	94		S	48	105 *		3.6	0.9	0.2	70	47	22
140ct97 13:35	142	4.6	108	28	14	1.3	85											
12Apr97 09:15	141	3.7	114	21	17	1.1	76											
10Apr97 18:20	138	3.8 *	111 *	26 *	28 *	1.2 *	91 <u>*</u>	8.0		25	5.0			E- 5.	7	2		C.C.
07Apr97 10:20	139	4.0	108	25	18	1.0	82			48	- 8		97 - 7 98 - 7	61 - 93 63 - 64		1		66 60
06Apr97 10:10	137	3.8	107	27	13	1.0	88											
05Apr97 10:00	141	3.7	107	26	11	1.0	87											
	Na	K	Cl	HCO3	BUN	Creat	Gluc	Ca	Phos	Urate	Chol	Tot Prot	Alb	TBili	DBili	Tot Alk P	AST	ALT
04Apr97 13:08	144	4.1	112	26			107			48	9			a sy				26 60
24Mar97 15:12	143	4.0	109	32	12	1.2	74					7.0	3.5	0.4	0.1	74	26	25
14Dec96 21:13	SPE	SPE	SPE	SPE	SPE	SPE	SPE											
13Dec96 12:50	138	3.5	110	28	7	1.0	80		6 6	25	6)			6 6				P.A.
12Dec96 12:10	140 *	3.9 *	108 *	25 *	6 <u>*</u>	1.0 *	82 <u>*</u>	8.3	1.6	45	8			a s	3			SF Sc
11Dec96 04:40	144 *	3.7 *	114 *	24 *			100000	8.1	2.1				3.2			41	22	9
10Dec96 21:20	145	3.8	113	24	13	0.9	84											

Case Studies

- Data summarization
- Research recruitment

Research Recruitment

- Data collected for patient care
- Monitoring system detects patterns
- Enrollment criteria can be logically defined

Case Study: Patient Recruitment

- Study of bisphosphonates in hypercalcemia
- Patients treated before enrollment ineligible
- Monitor checked for elevated calcium
- Monitor sent message to research fellow
- Enrollment was complete in two months

Case Studies

- Data summarization
- Research recruitment

Available Standards

- Terminologies
 - -ICD9-CM/ICD10/CM
 - -SNOMED-RT/CT
 - -LOINC

(Baorto DM, Cimino JJ, Parvin CA, Kahn MG. Combining laboratory data sets from multiple institutions using the logical observation identifier names and codes (LOINC). *International Journal of Medical Informatics*. 1998;51(1):29-37.

- Messaging
 - -Health Level 7 (HL7)
- Data Models
 - HL7 Reference Information Model (RIM)

Implications for Clinical Research

- Data collected for care can be reused for:
 - -Research
 - -Recruitment
 - Collaboration
 - Retrospective studies
- Reduce duplication of effort
- Longitudinal consistency
- Sharable and pool-able data